



# COVERCROP

VEGETABLE PRODUCTION TRAINING

## Why Plant Cover Crops?

**UofA** DIVISION OF AGRICULTURE  
RESEARCH & EXTENSION  
*University of Arkansas System*

# Outline

- What is a cover crop?
- Why plant cover crops
  - Soil health
  - Beneficial insects/pollinators
  - Organic matter
- Diversified cover crop systems mimic natural systems



# What is a cover crop?

A crop to cover the soil when it would otherwise sit fallow

*Not planted to be harvested and sold*



*Are planted for the effects they have on:*

- The next cash crop
- Improving soil health which results in healthier cash crops



# Soil Health

**A soil is not considered "healthy" if it is *managed for short term productivity at the expense of future degradation***

(Doran et al., 1994).



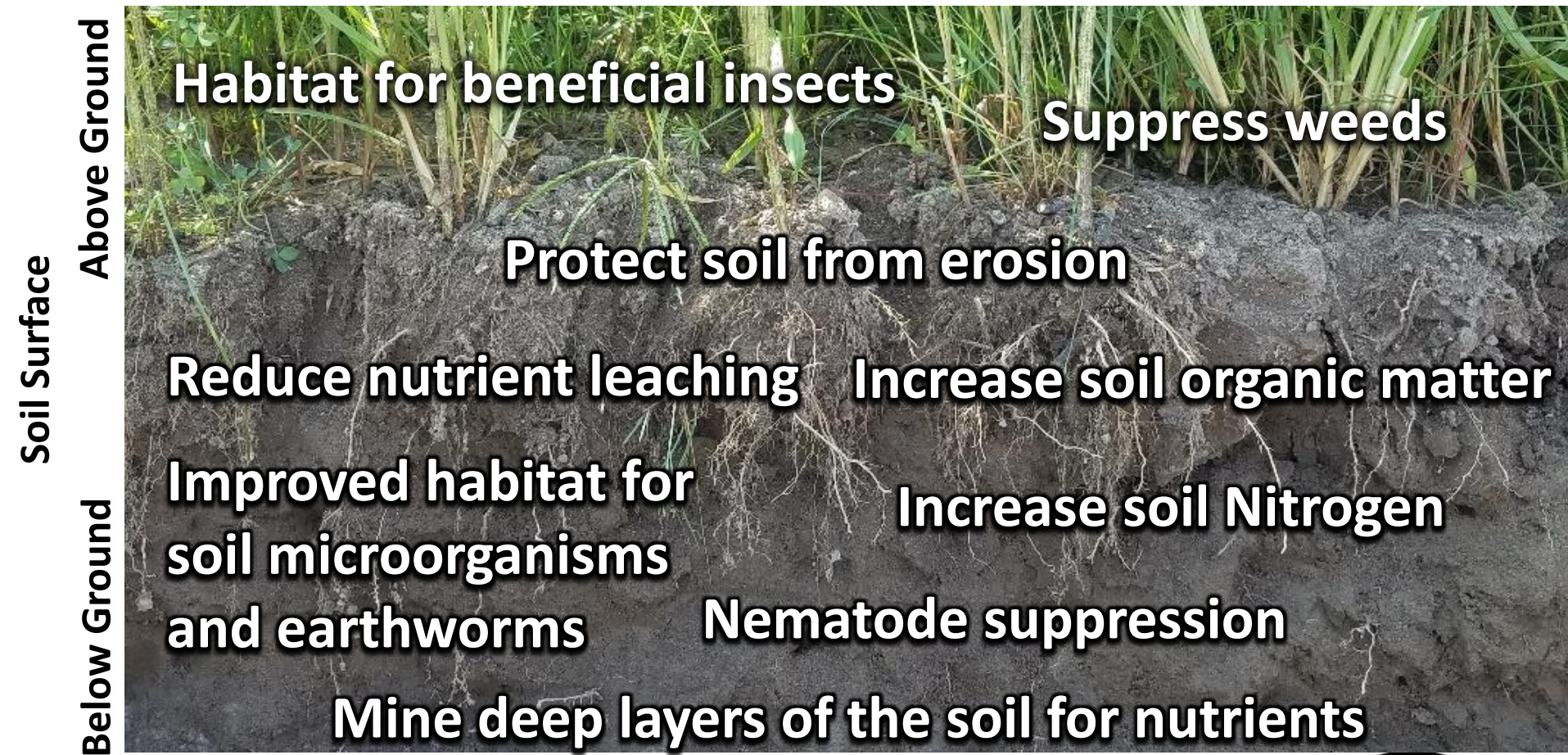
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**COVERCROP**  
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# Cover Crop Services





# Cover crops provide soil cover

*20-30 billion tons of soil is eroded due to water erosion and 2 billion or more tons due to wind erosion worldwide each year<sup>1</sup>*

**It takes 500-1,000 years to form 1 inch of topsoil**

*Soil is a non-renewable resource in our lifetimes*

✓ Soil cover helps reduce soil erosion caused by water<sup>1</sup>





# Cover Crops Can Suppress Weeds

Weed suppression can be accomplished:

- in the season the cover crop is planted
- in the following season if the cover crop residue is used as a weed mat or if the cover crop has *allelopathic* properties.

**No cover crop/  
bare ground**



**100 lbs. cowpea &  
10 lbs. pearl millet  
cover crop**





# Cover crops can reduce pest pressure

- Use cover crops to diversify crop rotations
  - Legume cash crop + grass cover crop
- Rotating to cover crops that are non-hosts can reduce nematode populations
- Brassica cover crops
  - biological fumigant crops

A close-up photograph of wheat stalks with green leaves and developing grain heads.

**Wheat**

A photograph of a dense field of green mustard plants with broad, rounded leaves.

**Mustard**

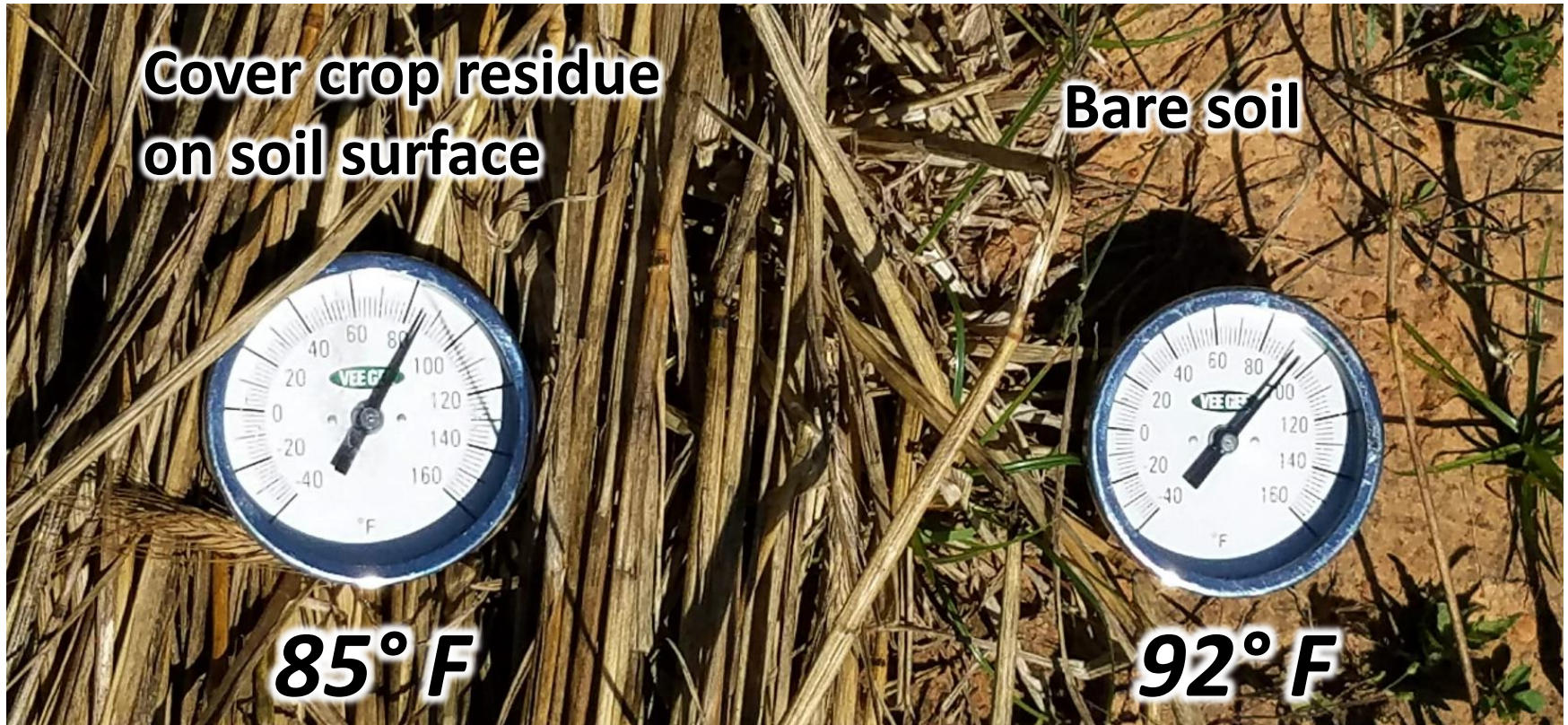
A photograph of Sorghum Sudan cover crop plants, showing tall green stalks and clusters of small, dark, developing seed heads.

**Sorghum  
Sudan**



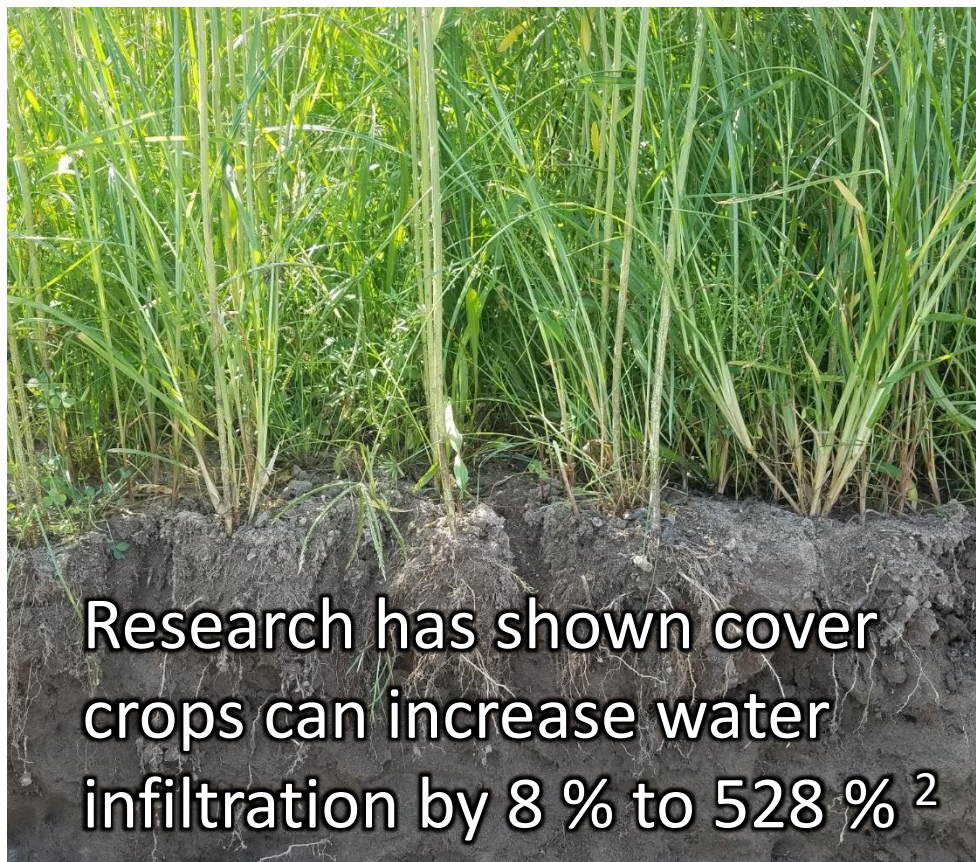


# Cover crops can affect soil temperature





# Cover crops can increase water infiltration and break up hard pans





# Cover crops can increase soil nitrogen

## *Biological Nitrogen Fixation*



*Rhizobia bacteria live inside the roots of legumes*





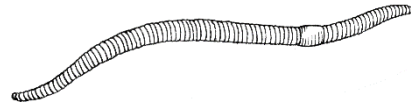
# Cover crops can reduce nutrient losses

Research has shown 1% to 89% less Nitrogen and 15% to 92% less Phosphorus in runoff samples collected from cover cropped ground<sup>3</sup>





# Cover crops can support beneficial soil microorganisms

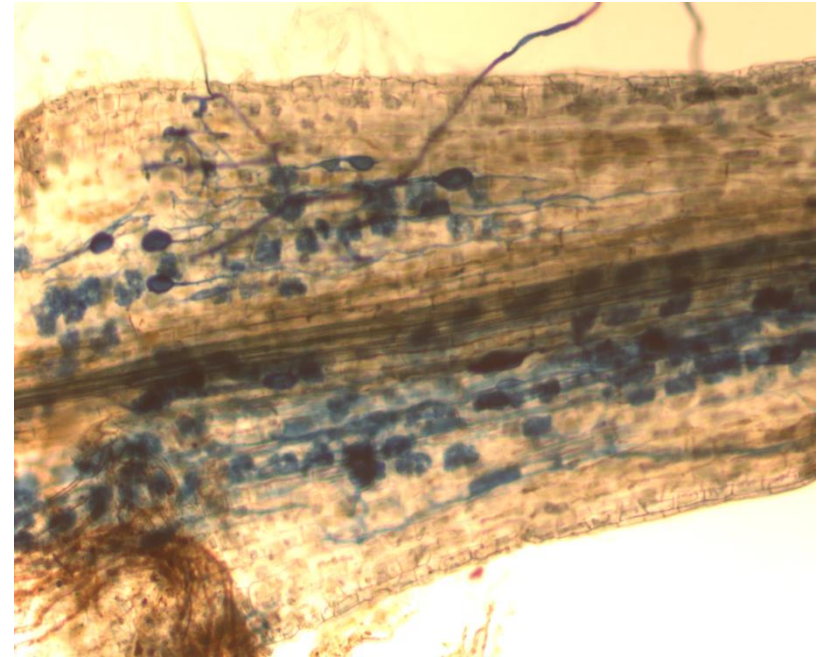


Example:

## Arbuscular mycorrhizal fungi (AMF)

live inside the roots of >80% of plant species.

- They help plants through increased nutrient uptake, and increase resistance to stresses (drought, root pathogens)
- *They require a plant host to survive.*
- Cover crops can help increase AMF populations in the soil <sup>6,7</sup>



*Strawberry root colonized by arbuscular mycorrhizal fungi (AMF) (stained blue)*





# Cover crops can provide habitat for beneficial insects

Early Spring

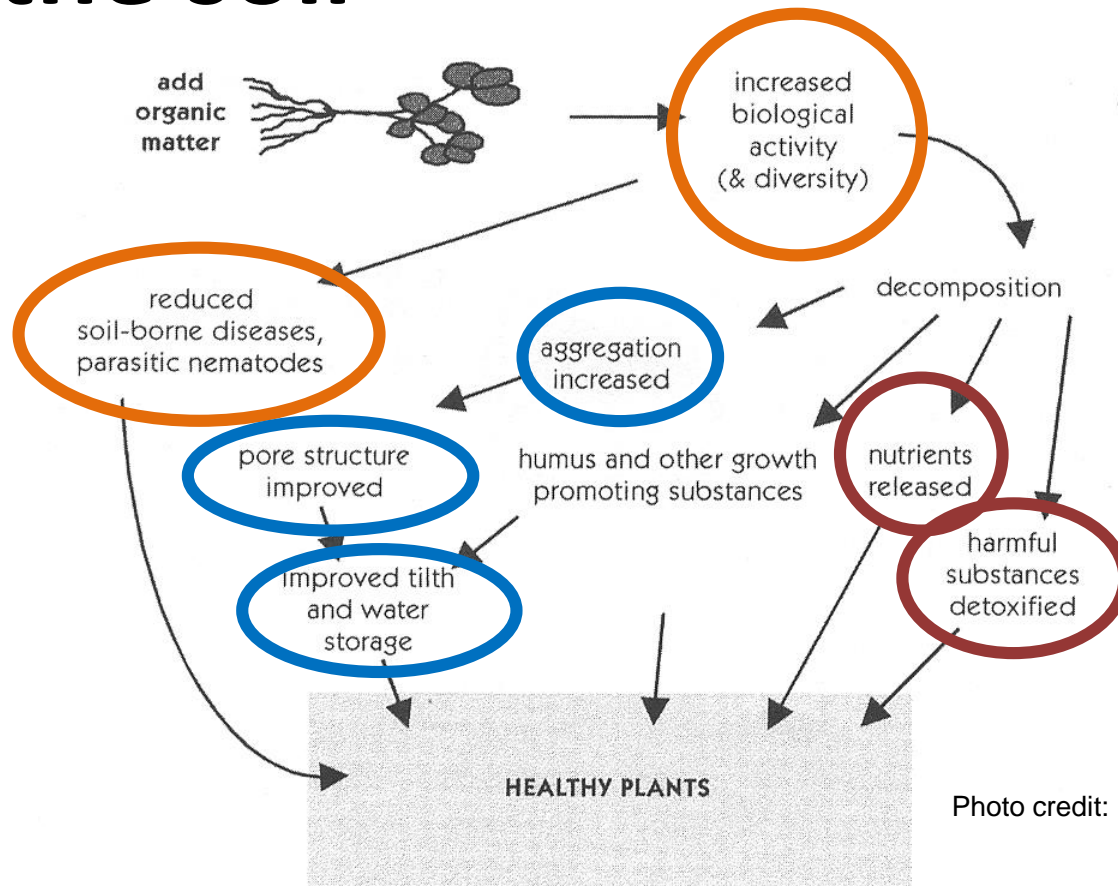


Mid Fall





# Cover crops add organic matter to the soil



## Soil Properties:

- **Biological**
- **Physical**
- **Chemical**

All three must be in balance for soil health to be achieved.

Photo credit: Building Soils for Better Crops, SARE <sup>4</sup>



# Take home message

- Cover crops can contribute to subsequent cash crops management, fertility and crop health.
- Cover crop provide multiple benefits that promote healthy function soils
- Organic matter additions from cover crops are key to improving the physical, biological and chemical properties of the soil.





# Authors and Acknowledgements

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# Resources and Sources

- <sup>1</sup> **Status of the World's Soil Resources** <http://www.fao.org/3/a-bc595e.pdf>
- <sup>2</sup> **Cover Crops at Work: Increasing Infiltration. Cover Crop Resource Series, SARE.**  
[https://www.sare.org/content/download/80109/1406598/Cover\\_Crops\\_at\\_Work\\_-\\_Increasing\\_Infiltration.pdf?inlinedownload=1](https://www.sare.org/content/download/80109/1406598/Cover_Crops_at_Work_-_Increasing_Infiltration.pdf?inlinedownload=1)
- <sup>3</sup> **Cover Crops at Work: Keeping Nutrients Out of Waterways. Cover Crop Resource Series, SARE.**  
[https://www.sare.org/content/download/80110/1406605/Cover\\_Crops\\_at\\_Work\\_-\\_Keeping\\_Nutrients\\_Out\\_of\\_Waterways.pdf?inlinedownload=1](https://www.sare.org/content/download/80110/1406605/Cover_Crops_at_Work_-_Keeping_Nutrients_Out_of_Waterways.pdf?inlinedownload=1)
- <sup>4</sup> **Ten Ways Cover Crops Enhance Soil Health. Soil Health and Cover Crop factsheets. SARE.**  
[https://www.sare.org/content/download/80998/1422252/10\\_ways\\_cover\\_crops\\_enhance\\_soil\\_health.pdf?inlinedownload=1](https://www.sare.org/content/download/80998/1422252/10_ways_cover_crops_enhance_soil_health.pdf?inlinedownload=1)
- <sup>5</sup> **Clark, A., editor. 2012. *Managing Cover Crops Profitably, 3rd Edition*. Sustainable Agriculture Research and Education. Handbook Series Book 9.** <https://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version/Printable-Version>
- <sup>6</sup> **First evidence for a major cover crop effect on arbuscular mycorrhizal fungi and organic maize growth**  
<https://link.springer.com/article/10.1007/s13593-013-0197-y>
- <sup>7</sup> **Positive effects of organic farming on below-ground mutualists: large-scale comparison of mycorrhizal fungal communities in agricultural soils**  
<https://nph.onlinelibrary.wiley.com/doi/full/10.1111/j.1469-8137.2010.03230.x>

